MEMO

To: Anni Autio, CDM Federal, Inc.
Mark Raney, VOLPE
From: Mary Goldade, USEPA Region 8
Date: 10/4/02
Subj: Collection of Libby Soils for Use as QA Samples in the PE Study

Anni and Mark:

Attached is a Technical Memo that describes the methods and sampling locations to be employed for collecting authentic Libby soils for use as quality assurance (QA) samples in the upcoming Performance Evaluation Study. This technical memo ranks as an amendment to the Project Plan for the Asbestos in Soil Performance Evaluation Study, Libby Asbestos Site, Libby, Montana (Part A) (USEPA 2000b). This technical memo has been approved for immediate use by me and by Jim Christiansen. Please authorize your field teams to implement the soil collection activities specified in this technical memo as soon as possible. Please do not hesitate to call me if there are any aspects of the plan that are not clear.

TECHNICAL MEMO 6
11/04/02

COLLECTION OF BULK LIBBY FIELD SOIL SAMPLES FOR USE IN THE ASBESTOS IN SOIL PERFORMANCE EVALUATION (PE) STUDY

1.0 INTRODUCTION

The Libby Asbestos in Soil Performance Evaluation Study (the "PE" study), which is planned to begin in a short time, calls for round-robin analysis of a number of soil samples by a number of different laboratories using a number of different analytical methods. The draft project plan (dated October, 2000) focuses on the analysis of a set of "PE" samples, which are soil samples spiked with known amounts of Libby amphibole or chrysotile. Analysis of this type of sample allows for an empiric evaluation of within- and between-laboratory accuracy and precision for each method. Based on more recent discussions, consensus has been reached that it will also be helpful to include a number of samples that are unspiked samples of Libby soil. USGS has proposed that these be referred to as "QC" samples. These samples have the benefit of being entirely authentic, and may better capture the variability in soil type and potential interferences that may exit at different locations across the community. Analysis of this type of soil allows for a direct evaluation of within and between-laboratory precision, and will also allow for an evaluation of accuracy once a consensus value is established.

Because collection of field soil samples in Libby may soon be prohibited by the approach of freezing weather, the collection of sufficient soil material to support the PE study needs to be carried out as soon as possible. The following sections describe the details of how this sample collection will occur.

2.0 SELECTION OF SAMPLING LOCATIONS

The soil matrix in Libby may vary from location to location, either as a result of natural geological forces, or as a result of human intervention (excavation, addition of fill or amendments, etc.). In either case, variability in soil matrix could lead to differing degrees of interference in some of the analytical methods that will be tested during the PE study. Thus, a key element of this part of the plan is to ensure that the QC soil samples span a range of soil types. In addition, in order to properly test the sensitivity and accuracy of the various analytical procedures across a range of concentration levels, it is important to collect soils that span a range of asbestos contents.

In order to achieve this objective, a set of 45 soil samples which had already been collected in Libby primarily during Phase I activities were selected for evaluation. These samples were

selected based on preliminary PLM results (measured in accord with the Phase I Project Plan) (USEPA 2000a) to ensure the samples would span a range of concentrations, including those that were assigned a PLM result of "ND" (no asbestos particles were observed), "Trace" (asbestos was present, but at a level too low to quantify), or "Quant" (asbestos is present, and the level was high enough to estimate the concentration).

These samples were visually inspected by a scientist from USGS and/or from CDM and each was assigned to one of three bins ("tan", "brown", and "rocky") based on visual characteristics such as soil color, texture, and perceived organic content. Samples classified as "rocky" were judged to resemble road base.

Eight of these samples (several of each soil category) were also evaluated by USGS by XRD analysis to characterize the major and minor mineralogical components of the samples. The results are summarized in Table 1. The USGS concluded that all of the soil samples evaluated were generally similar in their mineralogical composition (quartz is the major component in nearly all samples), and that differences in color were likely due to differences in organic content.

These 45 samples were also prepared for re-analysis for asbestos content in accord with SOP ISSI-LIBBY-01 and SOP SRC-LIBBY-02. These prepared samples were re-analyzed using PLM in accord with NIOSH Method 9002 (visual estimation method). As above, each sample was categorized as "ND" (no asbestos particles were observed), "Trace" (asbestos is present, but at a level too low to quantify), or "Quant" (asbestos is present, and the level is high enough to estimate the concentration). These results are presented in Table 2.

Based on these results, each of the 45 samples was assigned to a "bin" representing the soil type and the asbestos level (as indicated by the PLM re-analysis). These bin assignments are summarized in Table 3.

3.0 COLLECTION OF BULK FIELD SOIL SAMPLES

Field crews will return to the specified sampling locations (based on the GPS locations of the original samples), and will collect additional material (up to a maximum of 20 kg per location) from as many of the of "tan" and "brown" sampling locations (listed as index numbers 1-30 in Table 3) as possible. These samples are expected to provide a representative sampling of the range of organic content in site soils as well as the range of asbestos contents. Samples of "rocky" soils (index numbers 31-45) will not be re-collected, since the data indicate that the basic soil attributes of these samples are very similar to the other soils, and the presence of coarse rocky material (which would be sieved out prior to sample preparation) would require that the mass collected be substantially larger than for other soil types.

All soil collection and handling will be in accord with the basic methods specified in the PE Study Sampling and Quality Assurance Project Plan Part A (USEPA 2000b) and in the Contaminant Screening Study (CSS) Sampling and Analysis Plan (USEPA 2002). Applicable

Standard Operating Procedures (SOPs) developed by CDM, Inc., include SOP 4-1 (Field Logbook Content and Control), SOP 1-5 (Site-Specific Standard Operating Procedure for Soil Sample Collection), SOP 1-2 (Sample Custody), and SOP 2-5 (Packaging and Shipping of Environmental Samples).

Specific requirements and deviations for this collection effort are detailed below:

- All soil samples should be from the same depth range as the original sample (generally 1 inch for yard samples, up to 6 inches for garden samples)

- The area over which sample is collected may be as large as the property owner authorizes. Compositing of subsamples from a property is not required.

- All samples should be assigned a unique identification number using the following format:

  PE-XXXXX

The total mass of soil required for each QC sample bin is approximately 20-30 kg. It is expected that each bin will be prepared by compositing all available soils that are collected for that bin (i.e., from all available sampling locations in Table 3). This approach helps ensure the availability of sufficient mass (even if individual sampling locations do not provide sufficient material), and compositing will help ensure the representativeness of the samples. However, the individual field samples (each ranging in mass from 2-20 kg, depending on site conditions and owner approval) will be placed in a clean 5-gallon bucket and shipped under chain of custody to the CDM laboratory in Denver for use in the preparation of QC samples for use in the round robin component of the PE study.

REFERENCES

USEPA. 2000a, Sampling and Quality Assurance Project Plan (Revision 1) for Libby, Montana. Environmental Monitoring for Asbestos. Baseline Monitoring for Source Area and Residential Exposure to Tremolite-Actinolite Asbestos Fibers. January 4, 2000.

USEPA. 2000b. Project Plan for the Asbestos in Soil Performance Evaluation Study, Libby Asbestos Site, Libby, Montana. Part A. Collection of Soil and Asbestos Materials. June 2, 2000.

USEPA. 2002. Field Sampling and Analysis Plan for the Remedial Investigation of Contaminant Screening Study. Libby Asbestos Site, Operable Unit 4, Libby, Montana. April, 2002.

TABLE 1 XRD CHARACTERIZATION OF EIGHT LIBBY SOILS

Sample Number	PLM Value (a)	Visual Class	MineralType		
			Major	Minor	Trace
CS-10457	ND	Tan	Quartz	Albite Microcline	Muscovite Calcite Clinochlore
CS-10463	ND	Brown	Quartz	Albite	Muscovite Calcite Clinochlore
CS-10475	T	Rocky	Quartz	Albite	Muscovite Calcite Clinochlore Hydrobiotite
CS-10477	T	Brown	Quartz	Albite	Muscovite Calcite Clinochlore Orthoclase
CS-10485	T	Tan	Quartz	Albite	Calcite Clinchlore Orthoclase Hydrobiotite
CS-10496	D	Tan	Quartz	Albite Muscovite	Orthoclase Hydrobiotite Clinochlore
CS-10498	D	Rocky		Augite Quartz Orthoclase Albite	Hydrobiotite Muscovite Clinochlore
CS-10500	D	Brown	Quartz Vermiculite	Annite Phlogopite	Orthoclase Hydrobiotite Richterite

(a) The PLM result is the original value obtained during the Phase I investigation
ND = Non-detect
T = Trace
D = Detect (typically > 1%)

TABLE 2 SUMMARY OF SAMPLE REANALYSIS BY PLM

Index	Sample Number	Soil Category	PLM Result	
			Qualifier	Value
1	CS-10457	Tan	ND	
2	CS-10458	Rocky	ND	
3	CS-10459	Tan	ND	
4	CS-10460	Rocky	ND	
5	CS-10461	Tan	ND	
6	CS-10462	Rocky	ND	
7	CS-10463	Brown	ND	
8	CS-10464	Brown	<	1
9	CS-10465	Brown	ND	
10	CS-10466	Brown	<	1
11	CS-10467	Rocky	ND	
12	CS-10468	Tan	ND	
13	CS-10469	Tan	<	1
14	CS-10470	Brown	ND	
15	CS-10471	Rocky	ND	
16	CS-10472	Brown	<	1
17	CS-10473	Brown	<	1
18	CS-10474	Tan	<	1
19	CS-10475	Rocky	<	1
20	CS-10476	Brown	ND	
21	CS-10477	Brown	<	1
22	CS-10478	Tan	<	1
23	CS-10479	Brown	<	1
24	CS-10480	Rocky	ND	
25	CS-10481	Rocky	<	1
26	CS-10482	Tan	<	1
27	CS-10483	Rocky	<	1
28	CS-10484	Tan	<	1
29	CS-10485	Tan	<	1
30	CS-10486	Rocky	<	1
31	CS-10487	Tan		2
32	CS-10488	Tan		2
33	CS-10489	Tan		2
34	CS-10490	Tan		2
35	CS-10491	Brown	<	1
36	CS-10492	Brown	<	1
37	CS-10493	Brown	<	1
38	CS-10494	Rocky	ND	
39	CS-10495	Rocky		2
40	CS-10496	Tan		2
41	CS-10497	Rocky		2
42	CS-10498	Rocky	<	1
43	CS-10499	Rocky		2
44	CS-10500	Brown		8
45	CS-10501	Brown		4

TABLE 3 SAMPLE ASSIGNMENT TO BINS

Index	Soil Category	PLM Result	Sample Number
1	Brown	Trace	CS-10464
2			CS-10466
3			CS-10472
4			CS-10473
5			CS-10477
6			CS-10479
7			CS-10491
8			CS-10492
9			CS-10493
10		Non-Detect	CS-10463
11			CS-10465
12			CS-10470
13			CS-10476
14		High Detect	CS-10500
15			CS-10501
16	Tan	Trace	CS-10469
17			CS-10474
18			CS-10478
19			CS-10482
20			CS-10484
21			CS-10485
22		Non-Detect	CS-10457
23			CS-10459
24			CS-10461
25			CS-10468
26		Low Detect	CS-10487
27			CS-10488
28			CS-10489
29			CS-10490
30			CS-10496
31	Rocky	Trace	CS-10475
32			CS-10481
33			CS-10483
34			CS-10486
35			CS-10498
36		Non-Detect	CS-10458
37			CS-10460
38			CS-10462
39			CS-10467
40			CS-10471
41			CS-10480
42			CS-10494
43		Low Detect	CS-10495
44			CS-10497
45			CS-10499